Carbon Nanotube Gas Sensor, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

Sensing gas molecules is critical to environmental monitoring, control of chemical processes, space missions as well as agricultural and medical applications. Existing electrical sensor materials are based on semi-conducting metal oxides, silicon devices, organic materials and gas responsive polymers or ceramics. To achieve high chemical sensitivity, semi-conducting metal oxide sensors must be operated at elevated temperatures (200 to 600?C). This need for high temperature operation increases the device complexity and renders them unsuitable for real-time portable applications. On the other hand, conducting polymers and organic semi-conductors are suitable for room temperature operation, but exhibit limited sensitivity. Clearly, there is a need to develop new technology that will allow for operation at room temperature and atmospheric pressure and provide for high-sensitivity measurements and low response times. We have already experimentally demonstrated under our own Internal R&D funding, that carbon nanotubes provide this enabling technology This effort will experimentally demonstrate a new nanotube sensor technology, which is a radical departure from conventional nanotube sensor approaches. Tests already performed with the proposed carbon nanotube sensor indicate that the electrical response of each gas is unique and that the individual gas concentrations can also be determined.

Primary U.S. Work Locations and Key Partners

Carbon Nanotube Gas Sensor, Phase I

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Mainstream Engineering Corporation	Supporting Organization	Industry	Rockledge, Florida

Primary U.S. Work Locations	
California	Florida

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Robert Scaringe

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.6 Extreme Environments Related to Critical System Health Management